Applicants submit that neither OZAWA nor TZENG disclose (or suggest) the present invention's feature of using a fixed waveform storage system and a convolution system. As will be discussed below, pre-stored fixed waveforms are used in Applicants' invention to generate an excitation vector by convoluting an impulse vector having few pulses with a fixed waveform thereof. That is, according to a feature of the presently claimed invention, pre-stored fixed waveforms are used to generate an excitation vector, that is inputted to a gain processor, by convoluting an impulse vector having few pulses with a fixed waveform. Applicants submit that at least this feature is lacking from the prior art combination set forth by the Examiner.

Initially, Applicants wish to clarify certain terminology employed by those skilled in the art of voice coding. An excitation vector in a CELP speech codec is generally expressed in accordance with the following formula:

Excitation vector = (adaptive codebook gain)*(adaptive code vector) + (random codebook gain) * (random code vector)

In the field of voice coding, the phrase "random code vector" is often referred to as an excitation vector. Thus, it is becomes necessary to determine whether this phrase refers to the excitation vector indicated on the left-side of the above equation, or the random code vector indicated on the right-side of the above equation. Such a determination may be made by examining the text surrounding the phrase at question. Based on such an examination,

one skilled in the art will understand that the phrase "excitation vector", as employed in Applicants' invention, refers to the random code vector indicated on the right-side of the above equation, while the phrase "excitation signal" (e.g., v(n)), employed in equation 13 of OZAWA, refers to the excitation vector indicated on the left-side of the above equation.

OZAWA discloses a technique relating to a speech codec using a CELP method, in which information on a pulse position is provided from an excitation quantization circuit. The pulse is provided as an excitation vector after being modified. In OZAWA, the amplitudes of the pulses are modified using a pulse amplitude code vector that has been pre-stored in amplitude pattern storage circuit 359.

The excitation vector of OZAWA has few amplitude-modified pulses. On the other hand, the excitation vector of Applicants' invention comprises a complicated waveform that is generated by convolution between an input vector having few pulses and a few fixed waveforms having complicated shapes.

Further, Applicants submit that the Examiner's indication that Applicants' convolution calculation is disclosed in col. 7, lines 4-22 and col. 7, lines 22-30 of OZAWA (see page 3 of the Office Action) is erroneous. Based on the rejection set forth by the Examiner, Applicants believe that the Examiner is of the opinion that value β, calculated in equation 10 of OZAWA, is used to generate the excitation signal v (n) in equation 13 of OZAWA. However, an examination of equation 13 (along with a review of col. 7, line 65-col. 8, line 14 of OZAWA) discloses that β' (e.g., adaptive code vector quantized gain) and

not β (e.g., adaptive code vector optimal gain) is used in equation 13 of OZAWA. Thus, Applicants submit that a fixed number multiplied by v (n-T), for the purpose of adjusting the gain of v (n-T) in the excitation signal v (n) of equation 13, is not β calculated by a convolution calculation, but rather, β′ read from gain quantization circuit 365, and thus, no convolution calculation is used in equation 13.

A convolution calculation is associated with equation 9 of OZAWA. According to equation 9 of OZAWA, a convolution calculation of code vector v (n-T) (see, for example, col. 6, line 66-col. 7, line 1) is outputted from adaptive codebook circuit 500 having delay T with impulse response $h_w(n)$ (see, for example, col. 6 line 62-66) outputted from impulse response calculation circuit 310. In order to specify a value for delay T that minimizes a distortion of equation 8 of OZAWA, the convolution calculation of equation 9 of OZAWA is used. Thus, the convolution calculation (e.g., a convolution calculation used in a distortion generating section) of OZAWA differs from Applicants' convolution calculation that is performed to generate an excitation vector, in which a fixed waveform storage system is newly provided to perform the convolution calculation.

In view of the above, Applicants submit that the convolution calculation of OZAWA and the convolution system of the instant invention have fully different features, such as, for example, place of execution and purpose. Thus, Applicants submit that OZAWA can not be considered to disclose that which is claimed by Applicants.

Further, Applicants note that TZENG fails to disclose/suggest the generation of an excitation vector, by convoluting an impulse vector with a fixed waveform. TZENG discloses a CELP system that utilizes two different codebooks to store large amounts of information. An output from either of the two different codebooks is selected as an excitation vector, and is used for speech synthesis. According to TZENG, one output from the codebook is utilized as is (e.g., without modification) as an excitation vector. As a result, the codebook data must be extremely large (e.g., an enormous volume of codebook data is required). On the other hand, the modified excitation vector of the present invention is obtained by modifying an energy distribution of an input vector with fixed waveforms stored in a storage system. Thus, Applicants submit that TZENG fails to disclose or even suggest Applicants' feature of storing fixed waveforms in a storage system nor Applicants' modification of the input vector.

In view of the above, Applicants submit that even if one attempted to combine OZAWA and TZENG in the manner set forth by the Examiner, one would fail to arrive at the instant invention, as such a combination would at least lack Applicants' use of pre-stored fixed waveforms to generate an excitation vector by convoluting an impulse vector with a fixed waveform. Accordingly, Applicants submit that the present invention, as defined by the pending claims, is distinguishable from the prior art applied by the Examiner. Thus, the Examiner is respectfully requested to withdraw the 35 U.S.C. §103(a) rejection, to indicate the allowability of the pending claims, and to pass the application to issue.

SUMMARY AND CONCLUSION

In view of the fact that none of the art of record, whether considered alone or in the combination suggested by the Examiner, discloses or suggests the present invention as defined by the pending claims, and in further view of the above amendments and remarks, reconsideration of the Examiner's action and allowance of the present application are respectfully requested and are believed to be appropriate.

Should the Commissioner determine that an extension of time is required in order to render this response timely and/or complete, a formal request for an extension of time, under 37 C.F.R. §1.136(a), is herewith made in an amount equal to the time period required to render this response timely and/or complete. The Commissioner is authorized to charge any required extension of time fee under 37 C.F.R. §1.17 to Deposit Account No. 19-0089.

If there should be any questions concerning this application, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,
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Reg. 31,458

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Reg. No. 29,027

July 2, 2003

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